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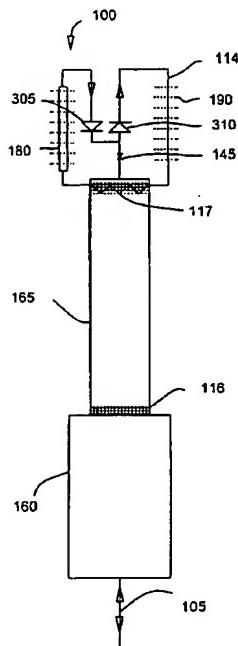
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*[Continued on next page]*

(54) Title: PULSE TUBE COOLING BY CIRCULATION OF BUFFER GAS

(57) Abstract: The present invention applies to single or two stage pulse tube (165) refrigerators that have one or more passive orifices (145) at the hot end(s) of the pulse tube(s) through which gas flows to achieve phase shifting and the phase shifting gas flow (114) circulates to a remote heat sink by adding check valves (305, 310) and an appropriate piping circuit.



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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/00381

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F25B 9/00

US CL : 62/6

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 62/6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NoneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
None

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,966,942 A (MITCHELL) 19 October 1999 (19.10.1999), see figures 11 and 13 and col. 13 lines 41-63.	1-3,8
Y	US 6,256,998 B1 (GAO) 10 July 2001 (10.07.2001), see figures 3,5,8 and 9	1-9
Y	JP 04-225755 A (SANYO ELECTRIC CO, LTD.) 14 August 1992 (14.08.1992), see figures 1 and 3.	1-9
A	US 6,094,921 A (ZHU et al) 01 August 2000 (01.08.2000), see figures 6,9 and 11.	1
A,P	US 6,351,954 B1 (NOGAWA et al) 05 March 2002 (05.03.2002), see entire document.	1
X	US 5,720,172 A (ISHIZAKI) 24 February 1998 (24.02.1998), see figures 3a,3b,12a,12b.	1,3,7-9
A	US 5,966,943 A (MITCHELL) 19 October 1999 (19.10.1999), see entire document.	1-9

<input type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input type="checkbox"/>	See patent family annex.
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"A"	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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